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P R E F A C E.

THE present volume contains, as usual, the detailed accounts (illustrated, where needful, by explanatory engravings) of all the useful inventions and meritorious exertions on subjects belonging to the polite or practical arts, which have been rewarded during the preceding session.

For the benefit of the public, and of those members who are prevented from habitual attendance on the meetings of the Society and of the committees, it has been customary to prefix a summary of the contents of the volume. This has been done for the purpose of placing in a clearer light, the annual contributions made by the Society to the common stock of useful knowledge, and also as affording an opportunity of giving such explanations respecting the motives which have actuated the Society in conferring their rewards, as any particular case may require.

In the Class of Agriculture and Rural Economy---
The large gold medal of the Society has been voted to Philip Hurd, Esq., being the premium offered for planting oaks for timber.

The extent of Mr. Hurd's plantation is not large, but it is rendered interesting from its situation, being at the foot of Highgate-hill, and therefore, probably, the nearest of any to the metropolis. The acorns were selected with great care, and in a season very favourable to their maturity; the soil is deep and strong, and well adapted to the growth of heavy timber; and the registry which the present volume contains may hereafter be of use in ascertaining the rate of growth of our most important forest tree.

To Henry Blyth, Esq., a large gold medal has been given, being the premium offered for embanking land from the sea. This gentleman has gained a tract of two hundred and fifty-three acres of rich land in the parish of Burnham Deepdale; which, during ordinary spring-tides, was covered with water to the depth of four or five feet. The undertaking

was successfully conducted under the superintendence of Mr. Telford, by erecting a bank a mile and a half long, of such solidity as to have resisted some very heavy gales of wind. Part of the land thus reclaimed has been broken up for tillage, part has been laid down to grass, and the remainder is preparing for cultivation, as fast as circumstances permit.

The sum of thirty guineas, being the premium offered, has been awarded to Messrs. Cowley and Staines of Winslow, for their continued successful cultivation of the white poppy, for the purpose of extracting opium from it.

This is the third premium, to the same amount, which has been given to these gentlemen for British opium. In the year 1821, from four acres of poppy, they obtained sixty pounds of opium; in the next year, from eleven acres, they obtained one hundred and forty-three pounds, and in the last year, from a little more than twelve acres, they obtained one hundred and ninety-six pounds.

The quality of their first produce was considered to be equal to Turkey opium; and is now, from its superior purity, in such estimation, that the last crop has sold readily at a price of two shillings per pound above the best foreign opium in the market.

The results of three successive years show that capital can be profitably engaged in this branch of cultivation, and it has the farther advantage of employing great numbers of women and children during the season of collecting the juice; the expense of this part of the process alone amounting to nine shillings and sixpence on every pound weight of opium obtained.

The thanks of the Society have been voted to Mr. Salisbury of Brompton, for his diligence in collecting facts tending to show that the *phormium tenax*, or New Zealand flax, may be successfully cultivated in the south-western counties of England, and in many parts of Ireland. As the plant is perennial and propagated by offsets, and as the flax or fibre is contained in the leaves, it seems peculiarly well

adapted for the moist warm climate of Ireland. The Society therefore earnestly recommend a full and fair trial of it to the landholders of the sister kingdom.

In the Class of Chemistry---The large silver medal has been given to Mr. Dickinson of the Kent-road, for a self-acting machine, by means of which malt-liquors, while in a state of fermentation, are cleared with less trouble and smaller loss of liquor than usual. It is particularly adapted to breweries of rather small extent, and may be employed by those families who brew their own beer. Its mode of action is to supply the barrel with fresh liquor in proportion as the yeast is separated, so that it shall always be quite full.

A large silver medal has also been given to Mr. H. Wilkinson of Ludgate-hill, for his improved safety-chamber to the oxy-hydrogen blowpipe. Mr. Gurney was rewarded the year before last, for an apparatus which ensures the safety of the experimenter, when the orifice of the discharging pipe is very small. Mr. Wilkinson by filtering the gas through filamentous asbestos

as well as through wire gauze (which latter was used by Mr. Gurney) has increased the safety so as to allow the use of a larger discharging pipe, and has proportionally increased the range and utility of the instrument.

Mr. T. Griffiths of Kensington, has been rewarded with the silver Vulcan medal for his improved stop-cock for chemical purposes. The stop-cocks at present in use for transferring gases from one vessel to another are made of brass. Several of the gases are corrosive, and act readily either on brass or copper, the result of which is, that stop-cocks soon become leaky or useless in consequence of the plug being set fast: it may also be added that the results of delicate analytical experiments may be vitiated by the chemical action of the gas under examination on the material of the tube through which it is transferred. Mr. Griffiths, by lining the tube with platina, and by coating with the same metal all the surfaces with which the gases come in contact, while passing through a stop-cock, has obviated most of the inconveniences complained of, without inordinately increasing the cost of the instrument.

The large silver medal has been voted to Mr. Chapman, of Whitby, for his mode of consuming the smoke generated in the fire-places of steam-engine boilers. The premium offered by the Society for the complete accomplishment of this very desirable object is the large gold medal or fifty guineas. The testimonials accompanying Mr. Chapman's communication are from eye-witnesses, and persons of known respectability, and they all depose to his entire success. The scale, however, of Mr. Chapman's experiments (they being made only on a three horse power steam-engine) was not considered by the Society sufficiently large to entitle him to the full premium; it being well known that many methods are quite effectual when applied to small boilers, while with larger ones they fail of producing the anticipated results. The principal novelty in Mr. Chapman's practice is, that he makes the grate-bars in the form of hollow tubes, through which air flows in its passage to the back part of the fire-place, where, being already heated, it is brought in contact with the smoke, and occasions a considerably more com-

plete combustion of it than would happen if it were mixed with cold air.

The Society have directed the publication of the results of some experiments made at their request, on the value of East Indian annatto as a dyeing drug for silk. The article was placed at their disposal by the manufacturers of it in Bengal, and it is hoped that the trials made on it, in comparison with the best Spanish annatto, will be found useful.

In the Class of Polite Arts, besides the premiums which have been distributed for personal proficiency in various branches of the art of design, the large gold medal has been voted to Mr. Edmund Turrell of Somers Town, an engraver of eminence, for his improved menstruum for biting-in on steel plate.

The menstruum usually employed for this purpose has been nitric acid, or acidulous nitrate of copper, but this and various other liquids which have been tried, although they succeed to a certain degree, are very far from producing that clearness and depth of

line which the artist requires. A steel plate will give, at least, ten or twelve times more impressions than a copper plate will; but to the use of this material the want of a good menstruum was a very serious obstacle. Mr. Turrell, by supplying this deficiency, has rendered great service to his art: and, judging from the experiments performed by him in presence of the committee, as well as from the testimony, founded on experience, of his brother artists, the discovery promises to be of much importance.

Steel plate has not only been used as the material for etching on, but also has been employed with equally good effect, both as regards durability and excellence of execution, by the engravers in mezzotinto. In the session before last, a medal was given to Mr. Lupton, for one of the first mezzotintos on steel; and last year, Mr. Solly, one of the chairmen of the Committee of Polite Arts, employed Mr. Charles Turner to make an engraving on steel, from a portrait painted by Sir Joshua Reynolds. Twelve hundred impressions having been taken from this plate, were presented by Mr. Solly, with his accustomed liberality, to the Society, of which one

will be delivered with the present volume to each member.

The silver Isis medal and ten guineas have been conferred on Mr. Straker, for his improved method of embossing on wood. It may be employed either by itself or in conjunction with carving, and is founded on the fact, that if any depression be made on the surface of wood, by means of any blunt tool, such depressed part will assume its original height by subsequent immersion in warm water. Any given pattern, therefore, being indented or impressed on a plate of fine grained wood, the ground is to be reduced by filing or planing to the same level as the depressed part; the wood being then soaked in warm water, the indented portions resume their original height, appearing in relief more or less high, according to the previous depression.

The thanks of the Society have been voted to Mr. Joseph Fincher, assistant secretary at the Royal Institution, for his ingenious, simple, and very effectual mode of preventing fraudulent erasures in bankers' cheques, a crime by which many persons having

large money transactions, have of late suffered severely.

The thanks of the Society have also been voted to Mr. Ferguson, Mr. Lea, and Mr. Palmer, for their respective communications on the best and most effectual means of preventing the forgery of bank notes. These plans are published in the present volume, and will also be inserted in the second edition, now preparing, of the Society's report on the same subject.

The Society, desirous of knowing and of making the public acquainted with the real quality of the fine wools of late years imported from the colony of New South Wales, instituted, in the Class of Manufactures, a premium of the gold Isis medal for this purpose. On a former occasion it was given to Mr. Starkey, and last year has been awarded to David Maclean, Esq. Mr. Starkey's cloth was manufactured in Yorkshire, Mr. Maclean's in Gloucestershire. The characteristic of the New South Wales' wool is extreme softness. The only disadvantage to which it appears liable, is a deficiency in the qua-

lity of felting, on which account it appears better fitted to improve the quality of the harsher Merino wools of Spain and Germany, than to be employed by itself in the manufacture of fine cloth.

For some years past the Society has been turning its attention to the manufacture of British straw-plat in imitation of Leghorn. A bonnet, made of one of the native grasses of the state of Connecticut in North America, was four years ago laid before the Society, which, in fineness of material, appeared to equal the best articles of Italian manufacture. In return for a medal and a pecuniary donation, the Society obtained a packet of seed of the grass, and a particular account of the bleaching and other processes employed in manufacturing it. This information was published, the seed was distributed, and an explanation of the mode of platting according to the Italian pattern, and of subsequently uniting or knitting the plat together, was inserted in the Transactions; the intention of the Society being to await the result of their attempt to naturalize the American grass. In the mean time Mr. Cobbett investigated the subject under a different point of view: consider-

ing it to be very probable that some of our own grasses were possessed of the requisite qualities, he collected samples of several species, bleached them to a good colour by a cheap, simple, and easy process, and, having had them platted according to the Italian pattern, presented them to the Society. A medal, most amply merited, was awarded two years ago to Mr. Cobbett for his exertions; and, at the republication of the annual premium-list, rewards were offered both to encourage the growth of the American grass, and to promote the manufacture of bonnets in imitation of Leghorn from our native grasses. Nearly twenty claims for the latter premium were, during the last session, sent in from various parts of the country; and the Society, desirous of giving all the encouragement which other demands on their funds would allow, granted pecuniary or honorary rewards to sixteen of the candidates. The specimens sent, due allowance being made for the imperfections attending first attempts, are greatly to the credit of the authors, and afford a reasonable prospect of recovering, in no great length of time, a branch of manufacture, which, for many years, has been a source of ease and compe-

tence to the labouring classes, in districts less favoured than many others by natural advantages.

The sum of five guineas has been voted to Mr. P. Caron of Spitalfields, for a method, superior to that generally practised, of preventing a waviness or play of light, not unfrequently observed in plain silks, technically called watering, which detracts considerably from their value, and appears to be owing to unequal pressure of the folds on each other, as the web or piece is rolled on the cylinder during the progress of weaving.

In the Class of Mechanics—The sum of ten guineas has been given to Mr. Watt, for a screw wrench, and the silver Vulcan medal to Mr. Eddy of Oxford-street, for a modification of the same instrument; and five guineas have been voted to Mr. Gladwell of Garden-street, Vauxhall, for an improved plane for the use of carpenters. Expedition on the part of the workman, and precision in his work, depend materially on the tools which he employs. Any improvement in these, therefore, deserves, and has always received, a

due compensation from the Society. A modification calculated to save only half an hour in a day, is a gain of full four per cent. in the time or wages of all the workmen who enjoy the benefit of it, and when this is multiplied by the number of the men, and of working days in the year, an improvement, trivial, abstractedly considered, may be of more practical value than many an elaborate and ingenious invention.

The silver Vulcan medal and ten guineas have been voted to Mr. Welsh of Walworth, for his original screw. The manner in which this screw is formed is very ingenious, and dispenses with the use of a screw engine with its guide-screw, wheel-work, slide-rest, and other expensive fittings. With regard to the accuracy of the screw itself, it was found, when examined by the micrometer, to be erroneous only to the amount of one two hundred and fiftieth of an inch in thirty-four threads, and therefore deserves the character of a very good screw, though not sufficiently accurate for astronomical purposes.

The silver Vulcan medal and ten guineas have been voted to Mr. Duce of Wolverhampton, for his

quadruple lock for safe chests, all the bolts of which are shot or withdrawn, in succession, by a single revolution of the same key.

The large silver medal has been voted to Edward Speer, Esq., for his concentric chuck for the use of turners, which facilitates the operation of chucking, saves materials, and diminishes the risk to novices in the art, of injury to themselves, or to the tools which they employ.

Captain Bagnold has been rewarded with the silver Vulcan medal for an improvement on the culinary steam boiler, consisting in a bent tube connected with the steam-vessel, and dipping into a small cistern of water, by which arrangement the steam that would otherwise escape in vapour, to the annoyance of the bystanders, is condensed, while the bubbling of the steam in the cistern affords a useful indication to the person who is employing the apparatus.

To Mr. Aitkin the sum of twenty guineas has been awarded, for his remontoire escapement.

Mr. Bothway of Devonport has received the silver Vulcan medal for a very convenient apparatus for invalids confined to bed, by means of which they may vary their posture from recumbent to sitting, or the contrary, without assistance, and be supported, while sitting, more firmly, and therefore more agreeably, than by the usual application of pillows or cushions.

The sum of twenty guineas has been voted to Mr. Stirling of Glasgow, for his working drawings of a steam-engine, which remain with the Society for the inspection and use of the members and the public.

The large silver medal and fifteen guineas have been granted to Mr. Franklin, for his improved mode of feeding high-pressure steam-boilers. The advantages of this contrivance are, that the elastic pressure on each side of the feeding valve is equalized, and the apparatus, by means of a stone float, is rendered self-acting.

T. Bewley, Esq. of Montrath, in Ireland, has had the large silver medal voted to him for commu-

nicating the particulars of an apparatus by means of which he supplies the stories of his cotton factory with fresh air, warmed by means of the heat produced in burning lime, a mode of economizing fuel, which, in favourable situations, may be turned to good account.

To Mr. F. Richman, the large silver medal has been voted for his ingenious manner of raising a sunken floor.

The large gold medal has been voted to Mr. Ainger for his method of supporting beams, the ends of which, resting on the wall plate, have become decayed from dry-rot or any other cause. The plan, which will be found fully detailed in Mr Ainger's paper, has been successfully applied by the inventor to the roof of the church of St. Mary Aldermary in the City of London; and, by means of it, a very elaborate cieling, which had been reduced to a dangerous state by the failure of the ends of most of the beams by which it was supported, has been placed out of hazard without the smallest injury to the cieling itself.

The sum of ten guineas has been awarded to Richard Soper, recently invalided from the dock-yard at Devonport, for an improved ladle with a moveable lip, for paying the seams of ships, and for the useful addition of a strainer to the pitch boiler.

To Mr. W. P. Green, Lieutenant R. N., the large silver medal has been awarded for an improved mode of working ships' guns, whereby fewer men and less space than usual are required: it will therefore probably be found of use in the round sterns of the ships of war recently constructed by Sir. R. Seppings.

The sum of twenty guineas has been voted to Mr. Clint for an experiment, which, as far as it has been tried, has been found to be successful, of suspending the masts of cutter-rigged vessels by means of pivots in the deck, and of attaching to the lower end of the mast a cradle in which most of the ballast is placed. The mast thus swings on its pivots, and is retained in an upright position by the gravity of the attached ballast. When the wind blows strong the mast and rigging incline to leeward, while the vessel continues to go on an even keel. The supposed advantages of

this plan are, the capability of employing with safety a greater spread of sail than usual, and drifting less to leeward. The idea of swinging masts is novel; the inventor has shown considerable ingenuity in adapting it to practice in a half-decked whale-boat; the trials made with it have hitherto been successful, and the Society have thought it worthy of encouragement, without, however, pledging themselves decidedly as to its real importance, which farther experiment, and on a larger scale, can alone ascertain.

The large silver medal has been voted to Captain Burton, R. N., for his mode of securing an anchor to the bows of a ship, whereby the services of fewer men are required to disengage it previous to anchoring, and the hazard of serious accidents, from the ropes of the cat-head pullies getting entangled with the legs of the people, is avoided.

Mr. W. J. T. Hood, Lieutenant R. N., has had the gold Vulcan medal voted to him, for an improved mode of managing the screen glasses in the naval quadrant; whereby many opportunities of taking the altitude of the sun and moon for lunar observations,

for apparent time and other purposes familiar to navigators, which are now lost in consequence of the variable state of the weather in these latitudes, may be taken advantage of; a circumstance of the utmost importance in entering the British channel, and the want of which will often put a ship into great jeopardy.

The gold Vulcan medal has been voted to Mr. Smart of Pedlar's Acre, Lambeth, for his improved mode of supporting the topmasts of ships, by which the topmast is relieved from any dependence on the fid; and, in consequence, may be cast off and lowered whenever required without any difficulty, and without previously having recourse to the hazardous measure of slackening the shrouds, an advantage that every practical seaman will be duly sensible of.

In the Class of Colonies and Trade—M. Chazal of the Isle of France has had the large gold medal voted to him, being the premium offered to encourage the growth of silk in that colony.

The sum of thirty guineas has been voted to Mr. T. Kent, of New South Wales, for the importation

of some tons of extract of mimosa-bark, prepared by him in that colony, an article likely to come into considerable use as a tanning material. The native and imported supplies of oak-bark are by no means sufficient to answer the demand, in consequence of which many thousand South American hides are annually sent to the continent in a raw state, whereby the profit of converting them into leather is lost to the country.

The large gold medal has been voted to John Macarthur, Esq. of Sydney, New South Wales, and the large silver medal to Hannibal Macarthur, of the same colony, for importing into this country fine wool the produce of their own flocks. The fine quality of the Merino wool of New South Wales has been already mentioned, and is becoming the principal export of that rising colony. The exertions of Mr. J. Macarthur have most essentially contributed to the production of this valuable staple, and the Society have much pleasure in adding another gold medal to those formerly conferred on him for this object.